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Tribute to Dr. Abraham Horwitz (1910-2000)

Dr. Abraham Horwitz, a world-recognized expert in public health and nutrition who served as Director of the Pan American Health Organization (PAHO) from 1958 to 1975, died on 10 July in Washington, DC. He led PAHO through a period of important political, economic, and social changes. Through his important work in the field of public health, he emphasized the relationship between health and economic development, the strengthening of health statistics and the importance of health services organization. Dr. Horwitz also considered epidemiology as an essential tool for the progress of public health and promoted its development in the Americas. He believed that "the solution to many health problems in the Americas will be found using epidemiological processes." In 1961, during the Symposium on World Medicine at Yale University, he presented three areas of epidemiological practice that became the axes of the development of epidemiology in the Region of the Americas over the last decades: the practice of epidemiology in health services, epidemiological research, and training in epidemiology. PAHO's cooperation strategy for the strengthening of national epidemiological capacities in the countries of the Region was defined from these perspectives. In the 1980s, the main aspects of this strategy included the support to technical cooperation for the development of direct epidemiological services in the countries, the dissemination of epidemiological information, the support for resources mobilization and cooperation among countries, the collaboration with the countries to determine research needs, and the reorientation of existing training programs in medicine and public health. In the area of research in particular, Dr. Horwitz was precursor of the collaboration among countries, when he promoted what he called "an intellectual common market." Various studies emerged from these ideas, such as the multicentric infant mortality studies directed by Puffer and Serrano and others on malnutrition in conjunction with infectious diseases directed by Mata and Scrimshaw, among others.

During the 1980s, the role and practice of epidemiology were debated in multiple national and international forums. The strengthening of epidemiology has been dependent on the situation of epidemiological practice in the countries, the capacity for health situation analysis, and the response of existing health systems, their limitations and their prospects. Just as Dr. Horwitz described in 1961, many countries of the Americas continue today in what has been known as an epidemiological polarization, where communicable diseases persist and chronic problems occupy a critically important and increasing place. This situation continues to impose great challenges on epidemiology, which must continue to further the knowledge and explanation of different health profiles in order to facilitate the decision-making process in health policy formulation, systems organization, and in the design of interventions aimed at resolving specific health problems. In the area of health services systems, one of Dr. Horwitz' special interests, the consensus that appeared in recent decades is that epidemiology should intervene in four general fields: 1) health situation analysis, 2) epidemiological surveillance of diseases and other health problems, 3) causal and explanatory research on specific health problems, and 4) assessment of the impact on health of services and other actions. In other words, it should provide an adequate access to the scientific information generated in the countries and put together a training strategy for epidemiology oriented towards action.

Epidemiological activities at PAHO still aim at strengthening the analytical capacity and management of health programs and services. The role of epidemiology includes the generation, analysis, dissemination and utilization of strategic information that allows evaluation of the health situation and its trends, to identify the presence of needs and inequalities in health, and to establish effective health actions. The major lines of action include the reorganization and operation of epidemiological and health statistics services, surveillance of the health situation in the Region, production and dissemination of health information, support to training, research and development of methodological instruments, and to health impact assessment.

The definition of epidemiology proposed by Dr. Horwitz, as a science that "encompasses all humans interactions with their extended and immediate environment, both in a

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healthy and sick state" remains valid. He also said that "the principles on which [epidemiology] is based have remained stable" and that the only variables are "the changes and the adaptation to the environment" of all living things, which determine the appearance of diseases. However, epidemiology has become an even more dynamic discipline that makes use of many of the technological and conceptual developments of the last decades. In 1998, Dr. Horwitz described health as "a social product that is the responsibility of all" and that "requires cooperation of spheres of interest outside health." Similarly, today's epidemiology has to collaborate closely with other actors inside and outside of the health field, such as health services managers, and their alliance produces policies and strategies that have the greatest impact on the well-being of the populations. The use of new technologies such as Geographic Information Systems in public health now provides new prospects for the analysis of epidemiological data. Through the pedagogical use of Internet for training related to epidemiology, some obstacles to the teaching of this science have also disappeared.

Dr. Horwitz' visionary perspective on epidemiology will remain as a legacy for new generations of sanitarians in their work toward the achievement of equitable health.

The following article, which is mentioned in the Editorial, was published in the Spanish version of the September 1961 *Bulletin of the Pan American Sanitary Bureau*. It resulted from a presentation made by Dr. Abraham Horwitz during the Symposium on World Medicine at Yale University in New Haven, CT, on 17 March 1961.

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EPIDEMIOLOGY IN LATIN AMERICA

DR. ABRAHAM HORWITZ

According to Paul (1), 4,000 years had to pass before epidemiology became an independent discipline, and in 1920 it was finally in a position to appear as such among the arts and medical sciences. However, the concepts and principles on which modern epidemiology is based are essentially the same as those established by the most distinguished founders of this science.

Today the analytical reasoning of Snow, Panum, Goldberger, and Frost - to mention only a few significant figures in this field - is still being applied for the purpose of reaching a better understanding of the sick or healthy human being; and in our opinion, it should be applied even more to gain an accurate knowledge of humans as social beings.

By 1878, Hirsch (2) had already described historical and geographical pathology as the "science that…, in the first place, will present a general table of the frequency, the distribution and classes of diseases of humankind, in different times and in several points of the surface of the Earth; and secondly, will state the relation that exists between those diseases and the external environmental conditions that surround individuals and determine their lifestyle."

This description can be accepted as a definition of modern epidemiology, since as Frost (3) rightfully pointed out, it implies that epidemiology is essentially an inductive science, a science that not only deals with the distribution of diseases, but also frames, perhaps to a greater degree, that distribution within a consistent doctrine.

However epidemiology, like all the sciences in which assumptions play a part, can be defined in various ways. This multiplicity of definitions reflects the wealth of materials that it studies, since it encompasses all the factors related to human life regardless of its origin. Whatever definition we choose, the science of epidemiology, in its current concept, encompasses all the human interactions with their extended and immediate environment, both in a healthy and sick state. In this regard, the word epidemiology is synonymous with medical ecology.

Thus, it includes and facilitates the interpretation of life. And because the principles on which it is based have remained constant, the only variation comes from the circumstances in which diseases occur or do not occur, spread or do not spread; that is, from the changes in and the adaptation to the environment, which is the characteristic of all living things.

I would like to mention the opportunities for epidemiological studies that today's new world offers, especially in Latin America. We Latin Americans like to describe the Americas - with respect to the distribution of diseases - as a continent in transition, where the main quarantinable diseases are disappearing. There has not been one single case of cholera registered since the beginning of the century. In 1960, 250 cases of plague, the majority of jungle origin, were reported; there were 650 reported cases of typhus transmitted through lice, some 50 cases of jungle yellow fever, and smallpox did not reach 5,000 cases. It is true that the incidences of other communicable and diarrheal diseases are higher than they

should, but chronic diseases are already becoming important causes of death in most Latin American countries. Cancers, cardiovascular diseases, and accidents appear today among the 10 leading causes of death in these countries. At the same time, we are registering an increase in life expectancy, a growing industrialization and a fast urbanization. But contrasting with these fast social changes, which influence health problems and at the same time are influenced by them, is the fastest registered population growth in the world, widespread illiteracy, a per capita income that ranges between 100 and 500 dollars per year, the drawback of countries depending on export of a single product, insufficient investments, and the unavoidable consequences of all this, that is poverty and misery.

The solution to many health problems in the Americas will be found using epidemiological processes. Given the geographical variations of the diseases, there is not a field in which epidemiology does not have an important role to play. I wish to mention, as examples, some of the issues for which the Pan American Sanitary Bureau, Regional Office of the World Health Organization, is promoting fundamental epidemiological studies.

As long as no comparable mortality data are available, there cannot be progress in the epidemiological study of diseases in the Region. The evaluation of the quality of a death certificate, which Morris (4) calls "Operational Research", is a matter of general interest. In the Americas, we will study this problem in depth, recognizing in the first place, that the quality of death certificates has to be improved greatly and that it hinders the comparison of mortality statistics. We plan to prepare comparable data of selected cities, through the acquisition of a complete clinical history and the anatomico-pathological elements of each death; medical death certificates will be completed and systematically coded in accordance with international procedures. As a first step, researchers in ten or more medical schools will establish centers in which medical statisticians, epidemiologists, and pathologists will work jointly to provide the essential data for epidemiological studies. Once the distribution of mortality is known with accuracy - through death rates, by age groups, corresponding to specific diseases -, the investigators will begin exploring the factors causing the encountered differences. This type of coordinated research will make it possible to convert certain selected medical schools into practical research centers and thus provide high-quality training in epidemiology. The establishment of these centers, preferably in departments of preventive medicine, to train a new generation of epidemiologists, can have an enormous impact on the medical sciences. The National Institutes of Hygiene (USA) have just provided a grant to hold a conference for the purpose of planning these epidemiological studies in the Region of the Americas.

In the field of cardiovascular diseases, research is under way at the regional level to throw light upon the natural history of the atherosclerotic injuries observed in population groups that live in different environments and have genetic backgrounds that vary considerably. Histopathological laboratories in eleven countries, among them the United States and others of Central and South America, are sending specimens of aortas and coronary arteries obtained from necropsies to a central laboratory, to be examined for the purpose of determining the variations that are observed in the atherosclerotic lesions by age, weight, race, geography, nutritional status and disease. This authentically Inter-American project is being carried out by the Institute of Nutrition of Central America and Panama, under the auspices of the National Institutes of Hygiene of the Public Health Services of the United States of America and with cooperation of the School of Medicine of the University of the State of Louisiana. To date, more than 2,500 aortas and coronary arteries have been examined.

As malaria is yielding in the Americas under the impact of vast eradication programs, new epidemiological problems are beginning to arise, and problems that are in the process of disappearing, such as malaria, require new and intensive research. The fact that areas of stable transmission of malaria can now be delimited is, in itself, a manifestation of progress, but their existence despite well-executed interventions forces us to conduct new epidemiological research.

The persistence of malaria transmission in certain areas requires new research on the problems of behavior change in the rest habits of the anopheles, the transmission outside of residences, asymptomatic carriers, and the daytime transmission by certain vectors. The resistance of the anopheles to insecticides and of the plasmodia to drugs, as well as the genetic variations in the susceptibility to toxic substances are among the problems which we should face. It is also necessary to conduct studies for the evaluation of medicated salt programs and to determine with more precision the therapeutic effect of antimalarial drugs with respect to different strains of plasmodia. It is necessary to determine the role of migrating workers, nomadic and hard-to-reach populations, in the complex problem of malaria eradication.

Studies conducted in the Institute of Nutrition of Central America and Panama have demonstrated that there exists a synergistic relationship between malnutrition and infections such as diarrheal diseases, whooping cough and measles, a combination that causes death in children under 5 in many Latin American countries. This relation seems fragmented and circumstantial, and it is necessary to conduct adequate epidemiological studies to determine both its scope and its implications for preventive programs. INCAP is investigating this problem in three localities of Guatemala. In the first locality, a program is being developed to reduce infectious diseases by means of preventive measures, treatment and improvement of sanitation. In the second location, special attention is given to nutrition, and for this purpose milk and other protein-rich food is being distributed, while at the same time a nutrition education program is carried out. The third locality serves as control. It is expected that the

findings of this research will make an important contribution to our current knowledge.

With respect to the practice of public health, I wish to underline the imperative need to conduct epidemiological research on the subject of medical care, especially in those Latin American countries in which these activities are financed mainly with social security funds. The same should be said about the evaluation of health services needs for the planning of long-term programs. Diseases caused by virus, mental disorders, alcoholism, the dangers of radiation and atmospheric pollution also offer enormous possibilities for research to determine their effects on morbidity and mortality in the various countries. Comparative epidemiological studies would represent a valuable contribution for an in-depth knowledge of the cause and origin of the diseases.

I am totally in agreement with Dr. Morris (4), with regard to Latin America, when he states that "epidemiology is today the Cinderella of medical sciences" and that "it is necessary to say that public health needs more epidemiological studies, to the level of medicine in general, and even society as a whole."

As for the teaching of medicine, I do not believe that it is unfair to say that the concept of epidemiology is not receiving sufficient attention in the education of physicians and public health workers. Apparently, the predominant element in medical teaching continues to be the diagnosis and treatment of diseases. Due attention is not given to medicine as a social science, nor to the study of man as a biological and social entity, with the consequent result that, in medical studies, the analysis of the impact of health and disease on society is merely incidental and does not leave its mark on the student. Consequently, students do not form a conception of medicine as a science that brings together disease prevention, the treatment of patients and health promotion. The fulfillment of the responsibilities that they will assume in modern society will depend more on their intuition than on the knowledge that they have of the epidemiology of diseases in relation to the community.

In the field of public health, epidemiology has often been regarded as synonymous with communicable disease control. The practice and enforcement of knowledge have eclipsed the analysis and the making of assumptions. Epidemiology has been emphasized as a purely descriptive science. Frequently, we do without it in the analysis of common problems of any origin that affect the family, the group or the community. And it is with even less frequency regarded as an indispensable method for studying the operation of health services. The need is more obvious than ever for introducing into medical teaching a better and broader concept of epidemiology, and for duly preparing epidemiologists with a broad vision of the possibilities that science offers them. In this regard, international health organizations have a concrete function, of great importance, to return the true significance to the meaning of epidemiology, as the art of thinking well and interpreting life.

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Regional Meeting on Epidemiology and Health Situation Analysis

Santo Domingo, Dominican Republic

The **Regional Meeting on Epidemiology and Health Situation Analysis**, organized by the **Special Program for Health Analysis (SHA)** of the Pan American Health Organization (PAHO) took place on 14 and 15 September in Santo Domingo, Dominican Republic. The purpose of this meeting was to review the role of epidemiology in the new millennium, with an emphasis on Health Situation Analysis (HSA), the measurement of inequalities and impact evaluation. The meeting permitted the exchange of experiences with HSA methodologies, health situation rooms, the development of core data systems, and training programs in epidemiology. Participants included the Directors of Epidemiology and Biostatistics of 20 countries of the Region, Dr. Mirta Roses, PAHO's Assistant-Director, Dr. Carlos Castillo-Salgado, Chief of the SHA Program, and the technical staff of the SHA Program from PAHO's Representation offices in the countries and from its headquarters in Washington, DC. A summary of the report on this meeting will be included in the next issue of the *Epidemiological Bulletin*.

Update on the leading Causes of Mortality on the United States - Mexico Border: 1995-1997

Introduction

The bilingual publication (in English and Spanish), *Mortality Profiles of the Sister Communities on the United States – Mexico Border, 2000 Edition*[1], produced by the Pan American Health Organization (PAHO) in collaboration with the governments of Mexico and the United States, includes the most recent mortality data for the border area of both countries. The aim of the publication was to update to the 1995-1997 period the overall profile of the patterns of mortality previously described in *Mortality Profiles of the Sister Communities on the United States–Mexico Border, 1992–1994*[2]. The 2000 Edition continues to respond to the need for a comprehensive set of detailed reference tables on mortality with emphasis on smaller geographic areas and on the border area in particular. Although numerous communities have developed on both sides of the border, those with the largest populations were collectively designated by PAHO's Field Office/US–Mexico Border in El Paso, Texas, as the "Sister Communities." The counties or municipalities comprising the Sister Communities are shown in Figure 1 and became the unit of analysis. Mortality information from each Sister Community was aggregated to form the corresponding border totals reflecting overall mortality. To develop the mortality profiles of the border area, this information was then analyzed for leading causes of death and patterns of mortality in six broad causal groups and categorized by age and sex. The disparities shown in these profiles by cause, sex, and age group among the Sister Communities can be used to identify common problems and to establish comparisons between Sister Communities and the border region as a whole.

Mortality data for border areas of the United States were provided by the National Center for Health Statistics, U.S. Department of Health and Human Services, and those for Mexico were provided by the Dirección General de Estadística e Informática, Secretaría de Salud. Mid-year population estimates provided by the Consejo Nacional de Población (CONAPO) for Mexico and by the United States Bureau of the Census for the United States were used for the calculation of rates. Estimated populations for 1991–1997 were based on projections from the 1990 census in each country. Mortality and population data corresponding to national, state, and county/municipality levels by sex and cause were sent by both governments to PAHO's Special Program for Health Analysis where the information was processed, summarized, and analyzed. Tabulations were produced for selected cause groupings, seven broad age groups (under one year, 1-4, 5-14, 15-24, 25-44, 45-64 and 65 years and over) and by sex for the entire country, and for each of the Border States and Sister Communities. These data were then integrated into standardized formats to form a comprehensive set of reference tables and graphs. A synthesis of the main results follows.

Population and General Mortality

The 14 pairs of Sister Communities contain about 95% of the total United States–Mexico border population—an estimated 11 million people in 1997. Population growth during 1993–1997 in the border region has been rapid, averaging about 4.3% per year on Mexico's side of the border and 1.8% on the United States' side. A total of 177,909 deaths were registered during 1995–1997 among Sister Communities on both sides of the border, which corresponds to a crude mortality rate of 5.8 per 1,000 population. Of these, a total of 61,104 deaths were recorded among the Sister Communities of Mexico—a crude death rate of 4.7 per 1,000 population. On the United States side, a total of 116,805 deaths were recorded during 1995–1997, which represents a crude death rate of 6.7 per 1,000 population—a rate 43% higher than that on the Mexican side. However, the age-standardized mortality rate was 6.0 per 1,000 population on the Mexican border and 4.4 on the United States border (27% less). The overall age-standardized mortality rate for the combined United States–Mexico border region was 5.0 per 1,000 population.

Leading Causes of Death

The proportionate mortality corresponding to the five leading causes of death as a percentage of total deaths from defined causes in the United States–Mexico border region is shown by sex in Figure 2. Deaths from defined causes exclude causes assigned to the category "symptoms, signs and ill-defined conditions (ICD 9: 780–799)." It should be noted that the leading causes of death depend not only on the relative frequency of deaths in a category but also on the definition of the causal categories that are candidates for ranking. A "short" list containing 24 causal groupings of death was used to determine the leading causes of death.

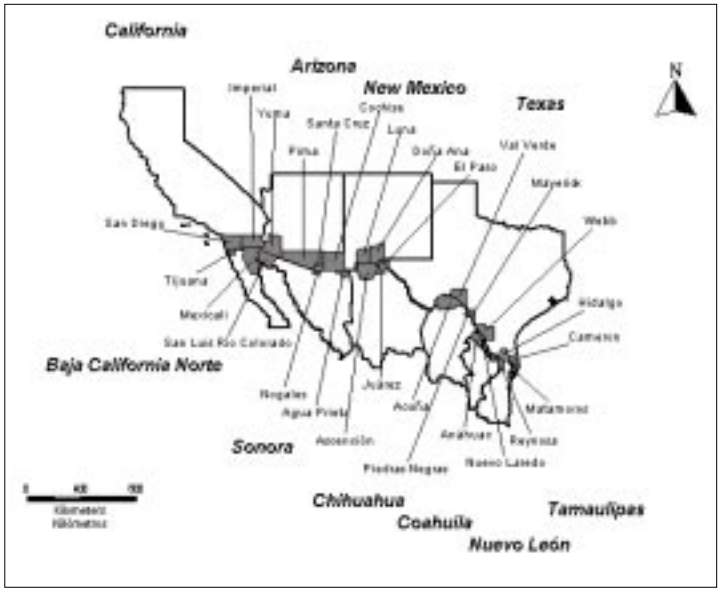
As can be seen in Figure 2, the first five causes of mortality account for about one-half (56%) of the deaths from defined causes in the total population on the Mexico border and for over two-thirds (70%) of deaths on the United States border. They account for about 53% of the deaths in males and 60% in females from defined causes in border areas of Mexico and for 70% and 72% of male and female deaths, respectively, in border areas of the United States.

In the period 1995–1997, as in 1992–1994, the leading cause of death on the border was diseases of the heart (ICD 9: 390–429). In the Mexican Sister Communities, a total of 11,209 deaths (18.7% of deaths from defined causes) were recorded from heart disease. In contrast, mortality was 3 times greater in United States Sister Communities, with 33,420 deaths (29.8% of deaths from defined causes). Within this disease category, ischemic heart disease (ICD 9: 410–414) accounted for 67% of the deaths on the Mexico side and for 64% on the United States side. Proportionately, deaths from heart disease were slightly greater among women than men. On the Mexican border, heart disease accounted for a total of 4,966 female deaths (20.6% of female deaths from defined causes)

and 6,242 male deaths (17.4% of male deaths from defined causes). On the United States border, heart disease had a much higher toll: 17,656 male deaths (29% of male deaths from defined causes) and 16,764 female deaths (30.6% of female deaths from defined causes).

Age-standardized death rates per 100,000 population are shown geographically in Figure 3 for the leading causes of death in the Sister Communities. These geographic maps provide the spatial distributions and magnitudes of the leading causes of death and help to identify inequalities in the patterns of mortality. Age-standardized death rates from heart disease for 1995–1997 were 128.5 per 100,000 males and 121.5 per 100,000 females in Sister Communities of Mexico. These rates were 32.7% and 11.6% higher than corresponding nationwide rates for Mexico: males, 96.8; females, 108.9. In contrast, age-standardized rates in Sister Communities of the United States of 123.5 in males and 113.5 in females were 20.8% and 21.5% lower, respectively, than nationwide rates in the United States by sex. The United States Sister Communities also had rates that were 4% and 6.6% lower for males and females, respectively, than for their counterparts in Mexico.

Figure 1: The Sister Communities on the United States-Mexico Border



Malignant tumors (ICD 9: 140–208) were ranked as the second leading cause of death on both sides of the border, with a total of 7,388 deaths in Sister Communities of Mexico and 26,657 deaths in Sister Communities of the United States. In the border communities of Mexico, malignant tumors accounted for 12.3% of all deaths from defined causes but the proportion was twice that (23.1%) on the United States side. A review of these deaths by tumor site indicates that, on the Mexico border, malignant neoplasms of the trachea, bronchus, and lung (ICD 9: 162) accounted for 17.3% of deaths; malignant neoplasms of the digestive organs and peritoneum (ICD 9: 150, 152, 155–159) accounted for 16.9% of deaths from malignant tumors; and malignant neoplasms of the cervix, uterus, body, and unspecified parts (ICD 9: 179, 180, 182) accounted for 9.1%. On the United States border, malignant neoplasms of the trachea, bronchus, and lung accounted for 25.5% of all malignant tumors, and malignant neoplasms of the female breast (ICD 9: 174) accounted for 8.3% of the total.

Accidents and adverse effects (ICD 9: E800–E949) were the third leading cause of death in the Sister Communities of Mexico, accounting for 6,346 deaths (10.6% of deaths from defined causes). In contrast, this group of causes was the fifth leading cause of death on the United States border, with 5,507 deaths — 4.8% of deaths from defined causes. However, among United States border males, accidents were the third leading cause of death, with 3,879 deaths (6.4% of male deaths from defined causes). Among Mexican border males, accidents ranked second as leading cause of death, with 5,048 deaths (14% of male deaths from defined causes). Among Mexican border females, deaths from accidents were the fifth leading cause, with 1,295 deaths (5.4% of female deaths from defined causes). However, among United States border females, accidents were not a leading cause of death. Motor vehicle accidents (ICD 9: E810–E825) accounted for 32.4% of deaths from all accidents on the Mexico side and for 45.2% of deaths in this cause group on the United States side. Also, it is of interest to note that accidents and adverse effects were the leading causes of death in all age groups up to 45 years of age (1–4, 5–14, 15–24, and 25–44) on both sides of the border.

The third leading cause of death in communities on the United States border was cerebrovascular disease, with 8,051 deaths, an age-standardized rate of 27.3 per 100,000 population. Nationally, the United States rate was 31.3 (14.7% higher). This disease also ranked third as a leading cause of female mortality with 4,662 deaths, an age-standardized rate of 31.7 per 100,000 population, and it ranked fourth as a cause of male mortality with 3,389 deaths (age-standardized rate of 23.1) in border communities of the United States. All border communities in the United States showed excess female mortality from cerebrovascular disease, with low masculinity mortality ratios calculated as the ratio of male:female age-standardized rates.

Diabetes mellitus (ICD 9: 250) was the fourth leading cause of death among Mexican communities on the border in 1995–1997. A total of 5,706 deaths were registered, accounting for 9.5% of the deaths from defined causes. Diabetes was also the fourth leading cause of death among Mexican border males, with 2,602 deaths recorded—7.2% of male deaths from defined causes. It was the third leading cause of death among Mexican border females, with 3,104 deaths or 12.9% of female deaths from defined causes. The following age-standardized death rates from diabetes were registered for the Mexico border: 63.5 in both sexes, 54.4 in males, and 73.1 in females. Compared with national data, the border rates were 27.6% higher for both sexes, 29.6% higher in males, and 26% higher in females. In comparison, diabetes mortality is about one-fifth the amount in areas of the United States border, with an age-standardized rate of 12.9 per 100,000 population. Compared with United States national data, age-stan-

dardized rates on the border were larger—about 0.3% overall (12.9 vs. 12.8), 1.5% higher in males but 1% lower in females.

The fourth leading cause of death in the United States border communities was chronic obstructive pulmonary disease (COPD) (ICD 9: 490–496), with 6,046 deaths, causing 5.2% of total deaths from defined causes. Among males in United States border communities, COPD ranked fifth, with 3,097 deaths (5.1% of male deaths from defined causes); among females it ranked fourth, with 2,949 deaths (5.4% of female deaths from defined causes). Age-standardized death rates from COPD were 20.4 per 100,000 population and 20.5 in males and 20.1 in females in border communities of the United States. These rates compared with United States national data were similar overall (21.0) but 8.6% lower than males nationally (22.3) and 1.4% higher than females nationally (19.8). Although COPD was not a leading cause of death in the border area of Mexico, it accounted for 1,757 deaths (2.9% of deaths from defined causes). The age-standardized rate of 20.2 per 100,000 population was about 1% less than in the United States border area. Masculinity mortality ratios show that mortality from COPD is predominant in men on both sides of the border.

Due to the relatively smaller numbers of deaths occurring in some Sister Communities, deaths over the period 1990–1997 were aggregated in order to determine the leading causes of death within each Sister Community. The leading cause of death in each community over this period was the same—diseases of the heart. Age-standardized rates ranged from a low of 101.3 per 100,000 population in Santa Cruz to a high of 180 in Agua Prieta. Among females, diseases of the heart was the leading cause of death in all communities on both sides of the border. Among males, the leading cause of death was also diseases of the heart in all but Tijuana, where it ranked second and accidents and adverse effects ranked first.

The second leading cause of death in 1990–1997 was malignant neoplasms in all but three communities—Tijuana, Nogales, and Ascención. In these communities, deaths from accidents and adverse effects were second and malignant neoplasms were third. Age-standardized rates for malignant neoplasms ranged from 64.1 in Anahuac to 111.4 in Pima. Among males, the second leading cause of death in 10 communities—Mexicali, San Luis Río Colorado, Nogales, Agua Prieta, Ascención, Juárez, Acuña, Nuevo Laredo, Reynosa, and Matamoros—was accidents and adverse effects; in Tijuana it was heart disease and in the remaining communities it was malignant neoplasms. Standardized rates from accidents and adverse effects ranged from 70.5 in San Luis Río Colorado to 130.4 in Ascención per 100,000 males, whereas standardized rates for malignant neoplasms ranged from 62.9 in Anahuac to

Figure 2: Five leading causes of death on the United States-Mexico Border, 1995-1997

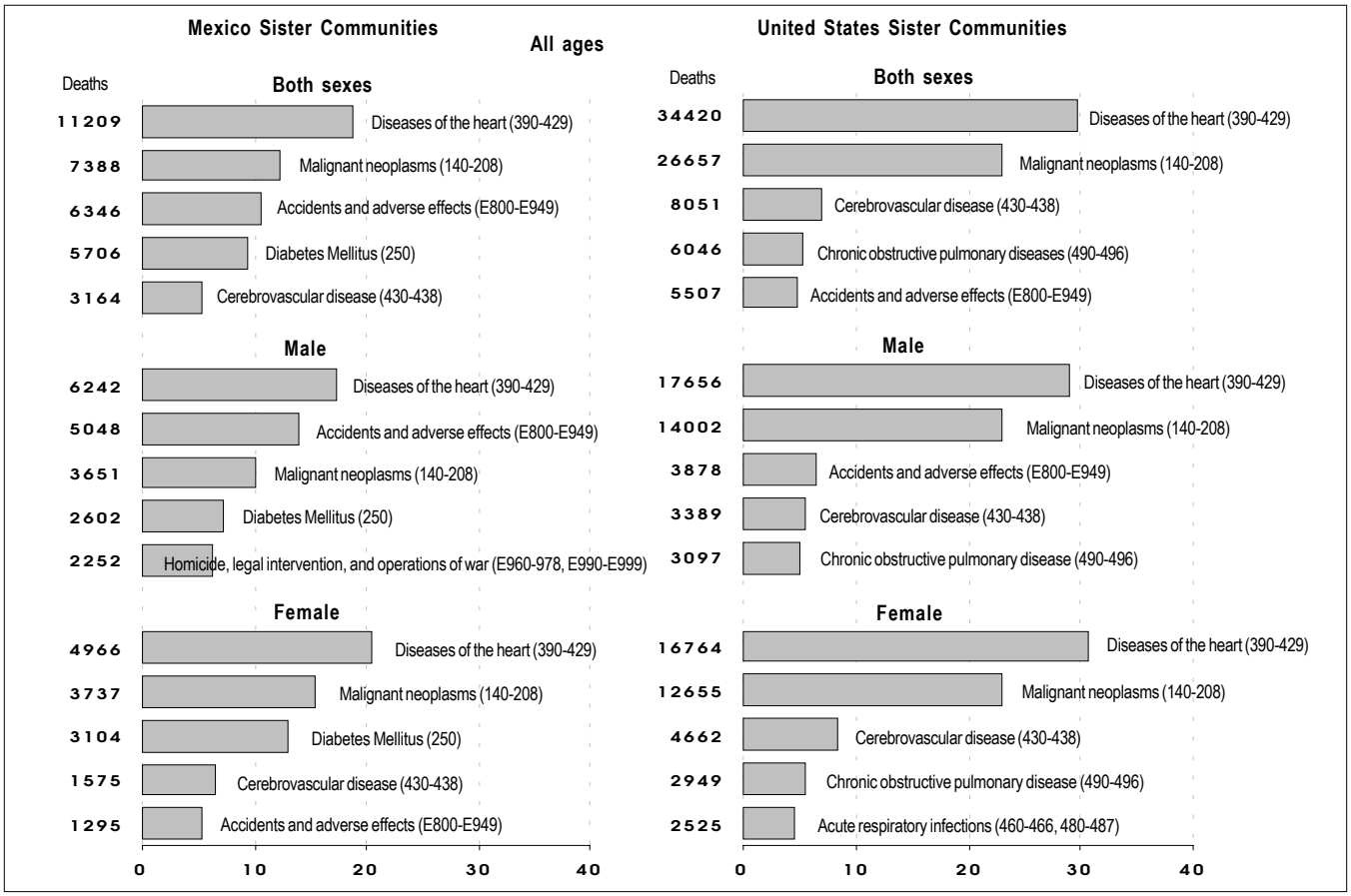


Figure 3: Leading causes of death in the Sister Communities of the United States-Mexico border, 1995-1997 (age-adjusted rates per 100,000 population)

Note: Number in parenthesis = number of affected communities corresponding to every adjusted rate

120.9 per 100,000 males in Pima. Among females, malignant neoplasms was the second leading cause of death in all border communities except for Acuña and Piedras Negras, where diabetes mellitus ranked second with rates of 93.1 and 101.4, respectively. In these two communities, malignant neoplasms ranked third. Nogales had the lowest standardized death rate from malignant neoplasms (72.0 per 100,000 females) and the rate in Agua Prieta (111.6 per 100,000 females) was the highest.

The third leading cause of death in 10 communities—five in Mexico and five in the United States—was accidents and adverse effects. In the United States border communities of Santa Cruz, Pima, San Diego, Imperial, Cochise, Val Verde, and Webb, cerebrovascular disease was the third leading cause of death. In the Mexico border communities of Acuña, Nuevo Laredo, San Luis Río Colorado, Piedras Negras, and Anahuac as well as in Maverick, the third leading cause of death was diabetes and in Luna it was COPD.

Of the leading causes of death in 1990–1997, accidents and adverse effects ranked second, third, fourth, or fifth; cerebrovascular disease ranked fifth in Mexico communities and third or fourth in United States communities; COPD was a leading cause only in United States communities—third, fourth, or fifth; certain conditions originating in the perinatal period was a leading cause only in Mexico communities (fourth or fifth); homicide was a leading cause only in Ascención (fifth); diabetes was a leading cause and ranked third, fourth, or fifth; and acute respiratory infections was ranked as a leading cause of death (fifth) only in Ascención and San Diego.

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Source: PAHO. Special Program for Health Analysis (SHA)

Copies of the publication may be obtained through the Special Program for Health Analysis (email: sha@paho.org).

Situation of Foot-and-Mouth disease in South America

Foot-and-mouth disease is an acute, highly contagious, viral disease that affects domestic and wild biungulate animals. Its clinical signs are characterized by fever and the formation of vesicles, mainly in the cavity of the mouth or nose, the interdigital spaces, and the coronary knots of the hoof. There are 7 immunologically different serotypes of foot-and-mouth disease viruses (A, O, C, SAT1, SAT2, SAT3 and Asia1), and several subtypes. The O, A and C types are widely distributed around the world and are the only ones found in the Americas. The SAT1, 2 and 3, and Asia1 types are found in Africa and Asia. Adequate control programs do not protect countries against the appearance of new subtypes or exotic types and given that the disease is highly contagious, a fast diagnosis is required, involving the joint intervention of epidemiologists, veterinarians, and laboratory staff. The resulting decrease in production and depreciation of animal products generate severe economic losses in the affected countries.

Within the Hemispheric Plan for Eradication of Foot-and-Mouth Disease initiated at the end of the 1980s, affected countries work to control the disease with national and regional livestock vaccination campaigns, with the ultimate goal of eradication. In the Region of the Southern Cone, Argentina, Chile and Uruguay were internationally recognized as free of disease without vaccination and Paraguay and the area of the States of Rio Grande do Sul and Santa Catarina, Brazil as free with vaccination. In the Andean Region, the Colombian area of Urabá Chocoano was declared free of disease without vaccination and the recognition of the Atlantic coast as free with vaccination is imminent.

On 2 August 2000, the situation in the Southern Cone was affected when 4 animals tested positive for foot-and-mouth disease in the Locality of Clorinda, Province of Formosa, Argentina, on the border with Paraguay. The A 24 subtype of the A virus was isolated from one of the animals. Emergency sanitary measures were initiated, including the slaughter of seropositive and exposed animals in the Provinces of Formosa, Corrientes and Entre Ríos, the introduction of animal quarantine measures, and active epidemiological surveillance at the national level, supported by serological studies in high-risk animal populations.

In the Municipality of Joia, located in the northwest part of the State of Rio Grande do Sul, Animal Health Services Officials from the Secretary of Agriculture confirmed at the end of July the suspicion of foot-and-mouth disease in four small properties of predominantly family production. On 23 August, after several tests resulted negative for foot-and-mouth disease, the O virus was diagnosed as the etiologic agent of the disease. Since vaccination had been suspended as of May 2000 due to the state's strategy to reach the status of free without vaccination, emergency sanitary measures had to be put in place, including the sanitary isolation of eight municipalities, the slaughter of 3,635 sick and exposed animals in 24 confirmed loci in four municipalities, the quarantine (prohibition of movements) of animals and the interdiction of commercialization of milk and other animal by-products.

On 5 September, authorities from the Colombian Livestock Institute (Instituto Colombiano Agropecuario, ICA) reported to the International Office of Epizootics (IOE) the existence of a herd affected with the O virus in a livestock property located in the Municipality of Necocli, Department of Antioquía, Colombia, outside the protected zone internationally recognized as free of foot-and-mouth disease without vaccination. The emergency measures included vaccination in the peripheral area and in the municipality, the sanitary slaughter and burial of sick and exposed animals, including pigs raised in the peripheral area.

Epidemiological research is in progress both in Brazil and Colombia in order to determine the origin of the disease. These events have had negative effects on the commercialization and exports of meats and animal products from the affected zones and countries towards the Canadian, US and Mexican markets, as well as to disease-free European and Asian countries. They have had a heavy economic impact on the producers, both in foreign and local markets.

The Pan American Health Organization, Regional Office of the World Health Organization, through the Pan American Foot-and-Mouth Disease Center (PANAFTOSA), has mobilized resources to provide the technical cooperation requested by affected and threatened countries, and has promoted technical cooperation among the countries, through existing formal entities that address problems related with foot-and-mouth disease such as: the Meeting of Ministers of Health and Agriculture (RIMSA), the Hemispheric Commission for the Eradication of Foot-and-mouth Disease (COHEFA), the South American Commission on Foot-and-Mouth Disease (COSALFA) and the Agreement for the Eradication of Foot-and-Mouth Disease in the River Plate Basin, among others.

Additional information on the situation of foot-and-mouth disease in the affected countries can be found on the Web sites of PANAFTOSA and the OIE: www.panaftosa.org.br and www.oie.int, and through the Animal Health Services of the Ministries of Agriculture of the countries.

Source: PAHO. Pan American Foot-and-Mouth Disease Center (PANAFTOSA). Division of Disease Prevention and Control, Veterinary Public Health Program (HCP/HCV).

Update on HIV/AIDS Surveillance in the Americas

The WHO/PAHO/UNAIDS Working Group on AIDS estimates that there are about 2.6 million people living with HIV in the Region: 1.3 million in Latin America, 360,000 in the Caribbean and close to one million in North America. The epidemic in the Americas is growing steadily. In 1997, our report on HIV/AIDS surveillance in the Region* mentioned a cumulative total of about 750,000 AIDS cases and 440,000 deaths since the inception of PAHO's surveillance system in 1986. As of May 2000, a cumulative total of 1,088,053 cases were reported in the Americas (see table 1), representing an increase of more than one third in the three-year period. At the same time, pediatric cases (less than 15 years of age) increased from 13,119 to 19,321, remaining at about 1.8 percent of all cases. A total of 513,522 deaths have been reported since 1986, but it is estimated that the number may be higher since data is incomplete for 1998-1999. The latest report* provided AIDS incidence rates for 1994 in Latin America of 58.2 per million population, 202.8 in the Caribbean and 236.3 in North America. By 1997, the incidence rate in Latin America had increased 34% to 77.7, and decreased 5% in the Caribbean to 191.9 and by 30% in North America to 165.8 per million population. Over the period 1994 to 1997, the male:female ratio of notified cases went from 3.5 to 2.6 in Latin America, 1.9 to 1.6 in the Caribbean and 4.4 to 3.3 in North America, showing a narrowing trend in these regions as the epidemic progresses.

The HIV epidemic in the Americas is very diverse. The Andean countries are apparently among those least affected by HIV infection in contrast to several Caribbean states that have been severely hit by the epidemic. At the end of 1999, over 5% of adults between 15 and 49 were HIV positive in Haiti, and in the Bahamas, the adult prevalence rate was over 4%.

The primary mode of HIV transmission in Central America and the Caribbean continues to be heterosexual. As of May 2000, exposure to the HIV virus through heterosexual contacts was responsible for 72.8% of all AIDS cases reported in Central America, 61.8% in the English-speaking Caribbean and 44.9% in the Latin Caribbean. In Guatemala and Belize, the heterosexual epidemic is growing fast, with HIV prevalence rates among adults in the general population between 1 and 2%. This is also reflected in the level of infection among pregnant women. The available data shows that in 1994 in Belize District for example, less than 1% of pregnant women using antenatal services tested positive for HIV, while the prevalence had risen to 2.5% in 1997. In other countries of Central America such as Costa Rica and Mexico, HIV is transmitted mainly during unprotected sex between men. As of May 2000, homo/bisexual transmission was responsible for 35.1% of the cumulative total of AIDS cases in Mexico, 42.3% in the Andean Region, 28.7% in Brazil and 49% in North America. In this case, the low prevalence of HIV infection among heterosexuals is reflected in a relatively low prevalence rate among pregnant women. In 1999 in Colombia, nowhere was the rate greater than 1 in 250 in this group. Transmission attributed to intravenous drug use is dominant in the Southern Cone, where 33.4% of AIDS cases reported as of May 2000 are due to exposure to the HIV virus through injection drug use, but also frequent in North America (33.2%) and Brazil (19.3%).

One of the important aspects of the epidemic in Latin America is that several countries, including Argentina, Brazil and Mexico, are providing antiretroviral therapy for people infected with HIV. Coverage still varies widely - access to antiretroviral therapy is more limited in Central America and Caribbean states for example - but these efforts are nevertheless having a definite impact. Although treatment is expensive, savings in the direct and indirect costs of illness and the improvement in both the length and quality of people's lives support the use of antiretroviral drugs that slow down the progression of the disease.

The provision of therapy is complicating the task of HIV and AIDS surveillance and increasing the proportion of people living with HIV. The weakness of some surveillance systems also make it difficult to determine trends over time. Other factors such as under diagnosis, under and delayed reporting affect the completeness and quality of the information for analysis and planning. PAHO and its Member States are working continuously to improve the quality and completeness of the data. To improve the collection of information, PAHO is currently implementing second generation HIV surveillance, which concentrates resources where they will yield information that is most useful in reducing the spread of HIV and providing care for those affected. These efforts are carried out in part through the use of networks of AIDS epidemiologists such as LAC EpiNet. All the relevant epidemiological information about each country in the American Region is presented in the Epidemiological Fact Sheets on HIV/AIDS and Sexually Transmitted Infections prepared by PAHO and the WHO/PAHO/UNAIDS Working Groups on Global HIV/AIDS and STI Surveillance. These notes can be accessed through the PAHO web page: www.paho.org.

References:

(1) UNAIDS Report on the Global HIV/AIDS epidemic (June 2000)

(2) PAHO Biannual Report on AIDS Surveillance in the Americas (May 2000)

(3) UNAIDS/WHO AIDS Epidemic Update (December 1999)

* See PAHO's *Epidemiological Bulletin*, Vol. 18, No. 1 (1997)

Source: PAHO. Division of Disease Prevention and Control, Program on AIDS and Sexually Transmitted Infections (HCP/HCA).

Table 1: Number of reported cases of AIDS by year, and cumulative cases and deaths, by country and subregion, as of May 2000

SUBREGION	Number of cases											
	Through 1992	1993	1994	1995	1996	1997	1998	1999	Unknown	Cumulative total	Total deaths	Last report
REGIONAL TOTAL	448,495	109,715	105,412	105,001	97,999	88,534	74,805	58,092	4,414	1,088,053	513,522	
LATIN AMERICA	98,355	28,202	30,926	33,499	35,856	37,878	30,392	11,428	4,351	306,536	115,915	
ANDEAN REGION	8,024	2,004	2,691	2,690	2,668	1,742	1,732	816	1,802	22,367	10,416	
Bolivia	56	21	18	18	28				25	141	107	Jan-98
Colombia	2,007	267	688	651	762	646	762	223	39	6,006	3,375	Dec-99
Ecuador	260	85	117	24	67				0	553	430	Jan-97
Peru	1,917	653	767	1,025	1,144	1,050	970	593	0	8,119	2,220	Dec-99
Venezuela	3,784	978	1,101	972	667	46			1,738	7,548	4,284	Apr-98
SOUTHERN CONE	4,194	1,864	2,612	2,684	3,211	2,948	2,232	911	6	20,656	6,368	
Argentina	3,025	1,460	2,161	2,157	2,556	2,157	1,630	527	0	15,673	3,883	Dec-99
Chile	733	246	297	350	421	522	395	163	0	3,127	1,631	Oct-99
Paraguay	79	55	35	50	78	96	27	49	5	469	242	Mar-00
Uruguay	357	103	119	127	156	173	180	172	1	1,387	612	May-00
BRAZIL	50,346	16,528	17,950	19,399	21,005	20,925	18,774	5,151	0	170,078	66,636	Dec-99
CENTRAL AMERICA	4,744	1,916	2,146	2,294	2,890	2,850	2,475	1,936	642	21,251	4,900	
Belize	44	29	45	28	38				67	184	190	Jan-97
Costa Rica	460	124	155	161	107	127	46	97	217	1,277	840	Dec-99
El Salvador	447	155	387	380	417	329	65	105	358	2,285	305	Aug-99
Guatemala	372	178	110	141	835	649	397	656	0	3,338	537	Feb-00
Honduras	2,900	1,201	1,123	1,221	1,086	1,261	1,478	596	0	10,866	1,081	Nov-99
Nicaragua	39	23	38	21	28	20	30	15	0	214	117	Nov-99
Panama	482	206	288	342	379	464	459	467	0	3,087	1,830	Dec-99
MEXICO	18,625	3,950	3,543	4,070	3,763	3,516	3,474	1,342	0	42,283	16,636	Jul-99
LATIN CARIBBEAN (a) (c)	7,383	584	526	533	509	4,448	503	270	922	14756	2847	
Cuba	165	82	102	116	99	127	142	56	39	889	578	Aug-99
Dominican Republic	2,248	502	424	417	410	389	361	214	16	4,965	989	Feb-00
Haiti	4,970					3,932			867	8,902	1,280	Jan-99
Puerto Rico	11,322	2,697	2,359	2,141	2,051	1,664	1,324	794		24,352	15,188	Dec-99
CARIBBEAN	5,039	1,356	1,458	1,829	1,810	1,449	1,202	1,002	979	15,145	8,112	
Anguilla	5								2	5	3	Jan-95
Antigua y Barbuda	31	23	16	7	13	7	2	14	7	113	75	Mar-00
Aruba	14	1		22					0	37	17	Apr-96
Bahamas	1,092	297	322	390	374	389	243	87	0	3,194	1,968	Jan-99
Barbados	328	90	119	95	130	113	168		0	1,043	856	Feb-99
Cayman Islands	15	0	4	0	3	1	2	1	0	26	19	Jan-99
Dominica	12	14	6	5	14	19	12	15	14	97	94	Jan-98
French Guiana	344	52	70	78	62	35			222	641	267	Jan-97
Grenada	34	21	7	18	18	4			9	102	68	Jan-97
Guadeloupe	391	135	104	106	73				466	809	226	Jan-97
Guyana	390	106	105	96	144	116	96	161	17	1,214	377	Feb-00
Jamaica	497	219	335	511	491	609	643	671	0	3,976	1,642	Feb-99
Martinique	239	44	49	41	42				9	415	184	Jan-97
Montserrat	5	1	0	0	0	0	1	0	5	7	0	Jan-99
Netherlands Antilles	123	36		76					220	235	74	Jan-96
Saint Kitts & Nevis	37	3	5	5	6	4			0	60	33	Jan-97
Saint Lucia	41	12	13	10	14	15	6		0	111	104	Jan-99
Saint Vincent and the Grenadines	46	8	13	6	12	16	28	51	0	180	123	Mar-00
Suriname	134	35	20	20	2				0	211	191	Jan-95
Trinidad and Tobago	1,228	243	269	340	412	118			7	2,610	1,754	Feb-00
Turks and Caicos Islands	25	14							0	39	30	Jan-93
Virgin Islands (UK)	8	2	1	3	0	3	1	2	1	20	7	Jan-98
NORTH AMERICA	350,140	81,513	74,486	71,502	62,143	50,656	44,413	46,664	63	781,517	397,607	
Bermuda	208	15	44	48	17	13	5	13	63	363	258	Mar-00
Canada	9,458	1,746	1,705	1,562	1,017	643	514	251	0	16,896	11,381	May-00
United States of America (b)	340,474	79,752	72,737	69,892	61,109	50,000	43,894	46,400	0	764,258	385,968	May-00
Virgin Islands (USA)	164		41	41	28				11	274	31	Aug-98

(a) Total number of cases and deaths reported by Puerto Rico has not been included in the Latin American Caribbean totals.
(b) Total number of cases and deaths of United States of America includes data from Puerto Rico and the Virgin Islands (USA).
(c) The increase of cases in the Latin Caribbean is a consequence of the inclusion of the reported cases for Haiti from the period of 1993-1997 in the 1998 report.

Case Definitions
Anthrax

Rationale for surveillance

Anthrax is a widespread zoonosis transmitted from domestic animals (cattle, sheep, goats, buffaloes, pigs and others) to humans by direct contact or through animal products. Human anthrax is a serious problem in several countries and has potential for explosive outbreaks (especially the gastrointestinal form); while pulmonary (inhalation) anthrax is mainly occupational, the threat of biological warfare attacks should not be forgotten. Anthrax has a serious impact on the trade of animal products.

The control of anthrax is based on its prevention in livestock: programmes based only on prevention in humans are costly and likely to be ineffective except for those industrially exposed. There is an effective vaccine for those occupationally exposed, and successful vaccines for livestock, particularly for herds with ongoing exposure to contaminated soil. In most countries anthrax is a notifiable disease. Surveillance is important to monitor the control programmes and to detect outbreaks.

Recommended case definition

Clinical description

An illness with acute onset characterized by several clinical forms. These are:

(a) localised form: (more frequent)

- *cutaneous*:
  skin lesion evolving over 2 to 6 days from a papular through a vesicular stage, to a depressed black eschar invariably accompanied by oedema that may be mild to extensive.

(b) systemic forms: (sporadic)

- *gastro-intestinal*:
  abdominal distress characterized by nausea, vomiting, anorexia and followed by fever.
- *pulmonary (inhalation)*:
  brief prodrome resembling acute viral respiratory illness, followed by rapid onset of hypoxia, dyspnoea and high temperature, with X-ray evidence of mediastinal widening.
- *meningeal*:
  acute onset of high fever possibly with convulsions, loss of consciousness, meningeal signs and symptoms; commonly noted in all systemic infections.

Laboratory criteria for diagnosis

Laboratory confirmation by **one or more** of the following:

- Isolation of *Bacillus anthracis* from a clinical specimen (e.g., blood, lesions, discharges).
- Demonstration of *B. anthracis* in a clinical specimen by microscopic examination of stained smears (vesicular fluid, blood, cerebrospinal fluid, pleural fluid, stools).
- Positive serology (ELISA, Western blot, toxin detection, chromatographic assay, fluorescent antibody test (FAT)).

Note: It may not be possible to demonstrate *B. anthracis* in clinical specimens if the patient has been treated with antimicrobial agents.

Case classification

Suspected: A case that is compatible with the clinical description **and** has an epidemiological link to confirmed or suspected animal cases or contaminated animal products.

Probable: A suspected case that has a positive reaction to allergic skin test (in non-vaccinated individuals).

Confirmed: A suspected case that is laboratory-confirmed.

Recommended types of surveillance

Since the usual ratio of livestock cases to human cases is of the order of 10-20:1, it is ineffective to depend only on human case reports. Routine surveillance must be undertaken, especially in high-risk groups (slaughterhouse workers, shepherds, veterinarians, wool/hide workers), and unexplained sudden livestock deaths must be investigated. Mandatory immediate case-based reporting from peripheral level (health care providers or laboratory) to intermediate and central levels of public health sector and to the appropriate level of animal health sector. All cases must be investigated.

Routine monthly reporting of aggregated data on confirmed cases and investigation reports from intermediate to central level in public health and animal health sectors.

Recommended minimum data elements

Case-based data for investigation and reporting:

- Case classification by type (suspected / probable / confirmed), and by clinical form (cutaneous / gastro-intestinal / pulmonary (inhalation) / meningeal)
- Unique identifier, age, sex, geographical information, occupation
- Date of onset, date of reporting
- Exposure history
- Outcome.

Aggregated data for reporting to central level:

- Number of confirmed cases by age, sex, clinical form (cutaneous / gastro-intestinal / pulmonary (inhalation) / meningeal).
- Similarly for livestock by outbreaks and cases in relation to species and appropriate geographic / administrative area.

Principal uses of data for decision-making

Surveillance data

- Estimate the magnitude of the problem in humans and animals
- Monitor the distribution and spread of the disease in humans and animals
- Detect outbreaks in humans and animals
- Monitor and evaluate the impact of prevention activities in humans and of control measures in animals

Investigation data

- Identify populations at risk
- Identify potentially contaminated products of animal origin
- Identify potentially contaminated animal sources (herds or flocks)

Brucellosis

Rationale for surveillance

Brucellosis is a widespread zoonosis transmitted from animals (cattle, sheeps, goats, pigs, camels and buffaloes), through direct contact with blood, placenta, foetuses or uterine secretions, or through consumption of infected raw animal products (especially milk and milk products). Human brucellosis due to *Brucella melitensis* has serious public health consequences in areas where goats and sheeps are raised. Brucellosis has an important world-wide impact on human health and the animal industry. In most countries brucellosis is a notificable disease. Control measures are based on prevention of risk factors. Surveillance is a key element for management of prevention and control programmes.

Recommended case definitions

Clinical description

An illness characterized by acute or insidious onset, with continued, intermittent or irregular fever of variable duration, profuse sweating particularly at night, fatigue, anorexia, weight loss, headache, arthralgia and generalized aching. Local infection of various organs may occur.

Laboratory criteria for diagnosis

- Isolation of *Brucella spp.* from clinical specimen **or**
- Brucella agglutination titre (e.g., standard tube agglutination tests: SAT>160) in one or more serum specimens obtained after onset of symptoms **or**
- ELISA (IgA, IgG, IgM), 2-mercaptoethanol test, complement fixation test, Coombs, fluorescent antibody test (FAT), and radioimmunoassay for detecting antilipopolysaccharide antibodies; and counterimmunoelectrophoresis (CIEP)

Case classification

Suspected: A case that is compatible with the clinical description **and** is epidemiologically linked to suspected or confirmed animal cases or contaminated animal products.

Probable: A suspected case that has a positive Rose Bengal test.

Confirmed: A suspected or probable case that is laboratory-confirmed.

Recommended types of surveillance

Routine surveillance must be undertaken, particularly among high-risk groups (farmers, shepherds, workers in slaughterhouses, butchers, veterinarians, laboratory personnel).

Mandatory early case-based reporting by health care providers or laboratory to upper levels of the public health sector as well as to the appropriate level of the animal health sector. In endemic countries where investigation of all reported cases may not be feasible, a representative proportion of reported cases should be investigated routinely.

Recommended minimum data elements

Case-based data for investigation and reporting

- Case classification
- Unique identifier, age, sex, geographical information and occupation
- Date of clinical onset, date of reporting
- Exposure history
- Outcome.

Aggregated data

Number of cases by case classification (probable / confirmed), age, sex, geographical area, occupation.

Principal use of data for decision-making

Surveillance data

- Estimate the magnitude of the problem in humans and animals
- Monitor the distribution of the disease in humans and animals
- Monitor and evaluate impact of prevention activities in humans, and of control / elimination measures in animals.

Investigation data

- Identify populations at risk
- Identify potentially contaminated products of animal origin
- Identify potentially infected animal sources (herds or flocks)

Rabies

Rationale for surveillance

Rabies, present on all continents and endemic in most African and Asian countries, is a fatal zoonotic viral disease, transmitted to humans through contact (mainly bites and scratches) with infected animals both domestic and wild. Over 40 000 human deaths are estimated to occur each year worldwide, most of them in the developing world (mainly in Asia), and an estimated 10 million people receive post-exposure treatment after being exposed to animals suspected of rabies.

WHO promotes:

- human rabies prevention through well-targeted post exposure treatment and increased availability of modern rabies vaccine.
- disease elimination through mass vaccination of dogs and other animal reservoirs. Surveillance of both human and animal rabies is essential to detect high risk areas and outbreaks quickly and to monitor the use of vaccine.

Recommended case definition

Clinical description

An acute neurological syndrome (encephalitis) dominated by forms of hyperactivity followed by paralytic syndromes that progresses towards coma and death, usually by respiratory failure, within 4 to 7 days after the first symptom if no intensive care is instituted. Bites or scratches from a suspected animal can usually be traced back in the patient medical history. The incubation period may vary from days to years but usually falls between 30 and 90 days.

Laboratory criteria for diagnosis

One or more of the following

- Detection of rabies antigen by direct fluorescent antibody (FA) in clinical specimens, preferably brain tissue (collected post mortem).
- Detection of rabies antigen by FA on skin or corneal smear (collected ante mortem).
- FA positive after inoculation of brain tissue, saliva or CSF in cell culture, in mice or in suckling mice.
- Detectable rabies-neutralising antibody titre in the CSF of an unvaccinated person.
- Identification of viral antigens by PCR on fixed tissue collected post mortem or in a clinical specimen (brain tissue or skin, cornea or saliva).
- Isolation of rabies virus from clinical specimens and confirmation of rabies viral antigens by direct fluorescent antibody testing.

Case classification

HUMAN RABIES**:**

Suspected: A case that is compatible with the clinical description.

Probable: A suspected case plus history of contact with a suspected rabid animal.

Confirmed: A suspected case that is laboratory-confirmed.

HUMAN EXPOSURE TO RABIES:

Possibly exposed: A person who had close contact (usually a bite or scratch) with a rabies-susceptible animal in (or originating from) a rabies-infected area.

Exposed: A person who had a close contact (usually a bite or scratch) with a laboratory-confirmed rabid animal.

Recommended types of surveillance

SURVEILLANCE IN HUMAN POPULATIONS:

Surveillance of human exposure to rabies:

At peripheral level, especially in rabies-infected areas, reports of patients with a history of animal contact (usually a bite / scratch) should be investigated at once; when required, they should be treated as an emergency. Case-based and aggregated data must be sent regularly from peripheral to intermediate and central level.

Surveillance of cases of human rabies:

Immediate reporting of suspected and confirmed cases from peripheral level (by diagnosing physician and laboratory) to intermediate and central level.

Rapid exchange of information with services in charge of animal rabies surveillance and control is required.

Epidemiological investigation of outbreaks: Investigation of all rabies foci, identifying sources of infection as well as humans and animals exposed or possibly exposed.

SURVEILLANCE IN ANIMAL POPULATIONS (EPIZOOTIC CONTROL):

Where the disease is endemic or could be reintroduced, surveillance of animal rabies and similar conditions in wild and domestic species most likely to be reservoirs of disease must be undertaken. Surveillance is laboratory-based. Brain specimen of suspected animals must be obtained for laboratory diagnosis when human exposure occurs. Suspected domestic animals at the origin of human exposure that cannot be killed must be kept under observation for 10 days. Rapid exchange of information between services in charge of human and animal rabies surveillance and control is required.

Recommended minimum data elements

HUMAN RABIES EXPOSURE

Case-based data: Unique identifier, name, age, geographical information, date(s) of bite / scratch, geographical information (location) of biting episode(s), category of exposure, local wound treatment, previous rabies vaccination and rabies immunoglobulin (human or animal origin) taken, current treatment, outcome; information on biting animal, vaccination history, outcome.

Aggregated data: Exposures by geographical information on biting episode, biting animal, outcome in animal and human populations.

SURVEILLANCE OF DEATHS FROM HUMAN RABIES:

Unique identifier, name, age, geographical information, date of onset of symptoms, date(s) of bite/scratch, geographical information (location) of biting episode(s), site of bite on the body, nature of bite, local wound treatment, vaccination history, previous serum treatment, hospital, treatment details, outcome, details of biting animal, samples taken, sample results.

Principal uses of data for decision-making:

- Detect outbreaks in endemic areas and new cases in rabies-free area.
- Determine high-risk areas for intervention.
- Rationalise the use of vaccine and immunoglobulin.
- Evaluate effectiveness of intervention at the level of the animal reservoir and exposed human population.

Epidemiological Calendar

2001									
EW	Month	S	M	T	W	T	F	S	Month
1	Dec	31	1	2	3	4	5	6	Jan
2	Jan	7	8	9	10	11	12	13	Jan
3	Jan	14	15	16	17	18	19	20	Jan
4	Jan	21	22	23	24	25	26	27	Jan
5	Jan	28	29	30	31	1	2	3	Feb
6	Feb	4	5	6	7	8	9	10	Feb
7	Feb	11	12	13	14	15	16	17	Feb
8	Feb	18	19	20	21	22	23	24	Feb
9	Feb	25	26	27	28	1	2	3	Mar
10	Mar	4	5	6	7	8	9	10	Mar
11	Mar	11	12	13	14	15	16	17	Mar
12	Mar	18	19	20	21	22	23	24	Mar
13	Mar	25	26	27	28	29	30	31	Mar
14	Apr	1	2	3	4	5	6	7	Apr
15	Apr	8	9	10	11	12	13	14	Apr
16	Apr	15	16	17	18	19	20	21	Apr
17	Apt	22	23	24	25	26	27	28	Apr
18	May	29	30	1	2	3	4	5	May
19	May	6	7	8	9	10	11	12	May
20	May	13	14	15	16	17	18	19	May
21	May	20	21	22	23	24	25	26	May
22	May	27	28	29	30	31	1	2	Jun
23	Jun	3	4	5	6	7	8	9	Jun
24	Jun	10	11	12	13	14	15	16	Jun
25	Jun	17	18	19	20	21	22	23	Jun
26	Jun	24	25	26	27	28	29	30	Jun
27	Jul	1	2	3	4	5	6	7	Jul
28	Jul	8	9	10	11	12	13	14	Jul
29	Jul	15	16	17	18	19	20	21	Jul
30	Jul	22	23	24	25	26	27	28	Jul
31	Jul	29	30	31	1	2	3	4	Aug
32	Aug	5	6	7	8	9	10	11	Aug
33	Aug	12	13	14	15	16	17	18	Aug
34	Aug	19	20	21	22	23	24	25	Aug
35	Aug	26	27	28	29	30	31	1	Sep
36	Sep	2	3	4	5	6	7	8	Sep
37	Sep	9	10	11	12	13	14	15	Sep
38	Sep	16	17	18	19	20	21	22	Sep
39	Sep	23	24	25	26	27	28	29	Sep
40	Sep	30	1	2	3	4	5	6	Oct
41	Oct	7	8	9	10	11	12	13	Oct
42	Oct	14	15	16	17	18	19	20	Oct
43	Oct	21	22	23	24	25	26	27	Oct
44	Oct	28	29	30	31	1	2	3	Nov
45	Nov	4	5	6	7	8	9	10	Nov
46	Nov	11	12	13	14	15	16	17	Nov
47	Nov	18	19	20	21	22	23	24	Nov
48	Nov	25	26	27	28	29	30	1	Dec
49	Dic	2	3	4	5	6	7	8	Dec
50	Dec	9	10	11	12	13	14	15	Dec
51	Dec	16	17	18	19	20	21	22	Dec
52	Dec	23	24	25	26	27	28	29	Dec

As in previous years, we are including the 2001 Epidemiological Calendar for our readers' practical use and easy reference.

The epidemiological calendar is comprised of 52 epidemiological weeks that divide the 365 days of the calendar year. Its use during surveillance activities is important because by standardizing the time variable, it provides a means to compare epidemiological events that occur in a country during a specific period of time to others occurring at a later time or in another country.

The 2001 epidemiological calendar actually begins on the 31st of December 2000. This is due to the fact that the first epidemiological week of the year ends, by definition, on the first Saturday of January, as long as it falls at least four days into the month. January 6, which meets this requirement, should therefore end the first epidemiological week of the year 2001. Each epidemiological week begins on a Sunday and ends on a Saturday.

Course on the Principles of Epidemiology and Biostatistics on the Internet in Spanish

The Special Program for Health Analysis (SHA) and the Human Resources Development Program (HSR) of the Pan American Health Organization, Regional Office of the World Health Organization in the Americas (PAHO/WHO), in coordination with the Universitat Oberta de Catalunya (Spain), are offering a **Spanish-language e-mail course on the Principles of Epidemiology and Biostatistics**, starting in October 2000.

This version of the course was created to respond to the needs of Spanish-speaking public health professionals for continuing education in epidemiology. Its goal is the development of competencies for the professional practice of epidemiology, and the learning process is largely based on the resolution of real-life problems routinely encountered by epidemiologists.

For further information, please visit the PAHO/WHO web site at: http://www.paho.org/Spanish/SHA/shaemailcrs.htm.

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